PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT: VERWOERD, G. - 1 PCT (RCE-2)

SERIAL NO.: 10/550,133 EXAMINER: Gilbert Y. LEE

FILED: OCTOBER 26, 2005 GROUP: 3676

TITLE: ANNULAR-GAP SEAL FOR A VALVE

BRIEF ON APPEAL

MAIL STOP: APPEAL BRIEF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 2313-1450

Dear Commissioner:

In accordance with the provisions of Rule 192(c), the following items under appropriate headings are provided:

(1) REAL PARTY IN INTEREST:

The real party in interest is Mokveld Valves, B.V., the assignee of the patent application identified in the caption above.

(2) RELATED APPEALS AND INTERFERENCES:

There are no other appeals or interferences known to Appellant, the Appellant's legal representative, or assignee

which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) STATUS OF CLAIMS:

Claims 8-13 are in the application and have been rejected in the Final Office Action of May 12, 2009. Claims 1-7 have been canceled. Claims 8-13 are being appealed.

((4) STATUS OF AMENDMENTS:

Claims 8-13 stand rejected under 35 USC §112, for failing to comply with the written description requirement, and under 35 USC §103(a) as being unpatentable over *Bosch, FR Patent No. 1,391,410* in view of *Reid, US Patent No. 2,859,061* and *Benware, US Patent No. 3,642,248*.

No amendments were filed after the Final Office Action dated May 12, 2009. Applicant amended claim 8 in response to the office action dated December 22 2008. This amendment was entered.

(5) SUMMARY OF CLAIMED SUBJECT MATTER:

The present invention is described below with reference to the page and line numbers from the specification. Such references

are for illustration only and are not intended to limit the claims. The drawings show stability data and do not show structural or process features of the claims, so no reference to drawing reference numbers is given here.

The present invention as claimed in independent claim 8 relates to a combination valve (1), piston (12), cylinder (9) and annular gap seal (20). The annular gap seal (20) blocks a flow of a fluid from a high-pressure side to a low-pressure side of the valve (1) in a blocked position. The valve (1) has a cylinder (9) which the fluid may flow through and in which the piston (12) is axially displaceable. (Substitute Specification, page 7, lines 19-page 8, line 15). There is an annular gap (19) between the piston (12) and the cylinder (9) which is sealable in the blocked position using the annular gap seal (20). (Substitute Specification, p 9, lines 1-9). The annular gap seal (20 lies in a peripheral groove (21) of the cylinder (9). (Substitute Specification, page 9, lines 10-15).

The groove (21) has a peripheral lug (32) that projects toward a middle plane of the groove (21) on both sides. (FIG. 1C; Specification, page 12, lines 8-11). The lug (32) has an interior surface facing the groove (21) that is upwardly inclined

from a wall of the groove toward the middle plane of the groove (21) (FIG. 1c). There are two sealing rings (24, 25) positioned mirror-symmetrically next to one another in the groove (21). (Fig. 2; Substitute specification page 9, lines 16-19). The sealing rings (24, 25) have a shoulder (31) corresponding to a shape of the inclined surface of the lug (32) and contact the lug (32) in an area where the lug (32) is inclined. A sealing surface of a first sealing ring (24) facing toward the low-pressure side (38) is able to be pressed fluid-tight against the groove wall by the fluid from the high-pressure side (37) in the blocked position (Substitute specification, page 3 line 17-page 4, line 1).

In the blocked position, the sealing shoulder (31) of the first sealing ring (25) facing toward the low—pressure side (38) may be pressed fluid—tight against the peripheral lug (32), which projects into the groove (21) toward the central plane of the groove (21). (FIG. 1c; Substitute Specification, page 12, lines 8-11.)

A sealing lip (27) of the first sealing ring (25) facing toward the low-pressure side (38) may be pressed fluid—tight against the piston (12) by the fluid from the high-pressure side

(37). (Substitute Specification, page 12, lines 13-16).

As claimed in claim 9, the sealing rings (24, 25) have a C—profile (28) and the C—profile (28)of the first sealing ring (25) facing toward the low-pressure side (38) is expandable in the blocked position by the fluid from the high-pressure side (37) (Substitute Specification, page 12, lines 5-8).

As claimed in claim 10, the annular gap seal has an oversized dimension in relation to the distance between piston (12) and groove base (34), so that the annular gap seal (20) may be laid in the groove (21) with pre-tension. (Substitute Specification page 4, lines 13-16).

As claimed in claim 11, there is a stabilizing element (26) which may be laid in the direction of the groove (21) with the sealing rings (24, 25) (Substitute Specification, page 10, lines 11-13, FIG. 2).

As claimed in claim 12, the stabilizing element (26) is a coiled spring which may be inserted in a torus shape (Substitute Specification, page 10, lines 11-13).

As claimed in claim 13, the sealing rings (24, 25) may be pre-tensioned radially in the direction of the piston (12) using the stabilizing element (26). (Substitute Specification, page 10, lines 6-9).

(6) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL:

Whether the rejection of claims 8-13 under 35 USC §112 is proper, or should be reversed. Whether the rejection of claims 8-13 under 35 USC §103 as being unpatentable over *Bosch* in view of *Reid* and *Benware* is proper, or should be reversed.

(7) ARGUMENT

The above-defined issue is believed to be in error and should be reversed for the following reasons:

The rejection of claim 8-13 under 35 USC §112 should be reversed

Claims 8-13 stand together. The Examiner rejected claims 8-13 under 35 USC §112 stating that the term "an interior surface facing the groove that is upwardly inclined from a wall of the groove" in claim 8 is not supported by the specification. The Examiner states that the current application does not disclose the orientation of the lug. Applicant respectfully traverses. The sealing rings are defined as having a C-profile 28 which

forms a sealing shoulder 31 below the sealing lip 27, which is tailored to the shape of the peripheral lug 32, which projects axially into the groove 21 and may be pressed fluid-tight thereon. The C-profile 28 ends in a lower sealing edge 33, which may be pressed against the groove base 34 of the groove 21. (See specification, page 10, first paragraph (emphasis added)). Thus the specific orientation of the sealing shoulder being below the sealing lip, and having a lower edge that is pressed against the groove base, defines an orientation where the groove base is at the bottom and the sealing lip is at the top. Thus, the "upward" incline of the interior surface facing the groove corresponds with the orientation of the sealing rings, which are pressed against the peripheral lugs, and thus "upwardly inclined" is directed to mean toward the direction of the sealing lips 27.

The Examiner also stated that the combination is shown as being annular in FIG. 1a. However, it is still possible to define a top and a bottom orientation in an annular configuration, as evidenced by the discussion above. Accordingly, Applicant submits that claims 8-13 are in compliance with 35 USC §112.

The Rejection of claims 8-13 under 35 USC 103 should be reversed

Claims 8-13 stand together.

The Examiner rejected claims 8-13 under 35 USC §103 as being unpatentable over *Bosch* in view of *Reid* and *Benware*. Applicant respectfully traverses.

Bosch discloses an exactly rectangular groove for the annular gap seal. Such a design is only practicable for embodiments whose piston is always limited by a cylinder wall in the area of the seal, so that an egression or elusion of the seal out of the groove is prevented. The lack of an undercut groove according to *Bosch* is a result of the field of application, namely an operation piston of a compressed air brake.

In contrast to this, the present invention claims an annular gap seal designed for valves, which are used in cases where the groove with integrated seal is typically not covered by a corresponding component. The present invention claims that the groove has an axially projecting peripheral lug on both sides, which presses against the sealing shoulder of the first sealing ring.

The advantage of the presently claimed annular gap seal is the improved sealing effect. This is achieved by the fact that the sealing rings do not only lie against a radial area of the groove (corresponding to the sealing surface (29)), but also against the area of the adjacent sealing shoulders, which corresponds to the peripheral lug. The one-piece design of the sealing rings avoids possible leakages in the contact area of these components. Because of the long sealing area resulting from the successive areas of the groove wall and the peripheral lug, fluid cannot pass through the sealing ring and the groove wall starting from the bottom of the groove.

Reid is not relevant to the present invention, as the groove in *Reid* is not a peripheral groove, but rather is embedded completely within the components of the device. In Figs. 17 to 23, the use of the sealing ring in a piston's groove is shown, and the groove with the embedded sealing ring is completely surrounded by components of the device, and no opening cross section exists, as with the peripheral groove of the present invention, which is located on the periphery of the device. Therefore, the structure of *Reid* is not a <u>peripheral</u> groove as claimed in claim 8 of the present application.

In *Benware*, the main seal consists of one component (part 119 on the cover sheet) sealing in two directions. In the present invention, two seals are claimed, one for each pressure direction. *Benware* uses an O—ring to provide the required tightness behind the seal on the inside of the groove. The present invention is without O—rings altogether. The *Benware* seal without O-rings is drawn with a spring. However, it is not indicated how the leak path from left to right – and vice versa – behind the seal through the inside of the groove is prevented. The spring-loaded *Benware* seal does not function at all, because it will leak. The seals of the present invention do not require an O—ring to work properly, and seals both on the outer diameter and on the inner diameter inside the groove. The *Benware* spring-loaded version fails to seal within the groove, so that it will not function.

Reid requires an O-ring to seal properly. It will not be possible to seal properly with the seal of Reid, if the O-ring is replaced by a spring taught by *Benware*.

Furthermore, combining lugs of *Benware* with a groove of *Reid* in the device of *Bosch* would not lead to the present invention, because *Reid* does not show a peripheral groove in the cylinder

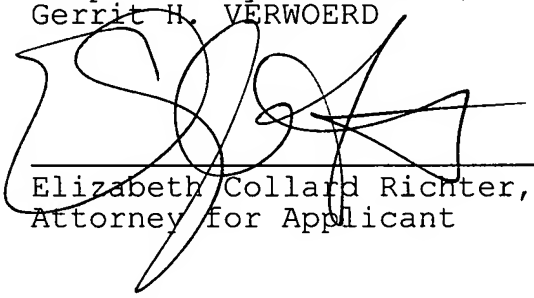
as described above. The groove and seal of *Reid*, with the lugs of *Benware* would not meet the requirements of claim 8.

The inclined lugs of the present invention causes the groove to form a conical shape rather than the cylindrical shape shown in *Benware*. In the present invention, the sealing ring has a corresponding inclined shoulder tailored to the shape of this inclined lug. This conical shape of the groove has advantages in that it better compensates wear of the tips of the sealing rings, because the sealing rings can be displaced radially towards the axis until the inclined shoulder 31 of the sealing ring comes into contact with the inclined underside of the peripheral lug.

Conclusion

In summary, Applicant submits that claims 8-13 fully comply with the requirements of 35 USC §112, and that claims 8-13 are patentable over the cited references, taken singly or in combination. Reversal of the Examiner's rejections is respectfully requested.

Respectfully submitted,
Gerrit H. VERWOERD



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Enclosure: Appendices A-C

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: MAIL STOP: APPEAL BRIEF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on September 8, 2009.

Kelly Espitia

APPENDIX A

(9) APPENDIX

The Appealed claims are as follows:

8. A combination valve, piston, cylinder and annular gap seal, said annular gap seal blocking a flow of a fluid from a high-pressure side to a low-pressure side of the valve in a blocked position, the valve having said cylinder which the fluid may flow through and in which said piston is axially displaceable, and an annular gap between the piston and the cylinder being sealable in the blocked position using the annular gap seal, which lies in a peripheral groove of the cylinder, the groove having a peripheral lug that projects toward a middle plane of the groove on both sides, said lug having an interior surface facing the groove that is upwardly inclined from a wall of the groove toward the middle plane of the groove, two sealing rings positioned mirror-symmetrically next to one another in the groove being provided, said sealing rings having a shoulder corresponding to a shape of the inclined surface of the lug and contacting the lug in an area where the lug is inclined, and a sealing surface of a first sealing ring facing toward the low-pressure side being able to be pressed fluid-tight against the groove wall by the fluid from the high-pressure side in the blocked position,

wherein, in the blocked position, the sealing shoulder of the first sealing ring facing toward the low-pressure side may be pressed fluid-tight against the peripheral lug, which projects into the groove toward the central plane of the groove, and a sealing lip of the first sealing ring facing toward the low-pressure side may be pressed fluid-tight against the piston by the fluid from the high-pressure side.

9. A combination valve, piston, cylinder and annular gap seal, according to claim 8, wherein the sealing rings have a C-profile and the C-profile of the first sealing ring facing toward the low-pressure side is expandable in the blocked position by the fluid from the high-pressure side.

10. A combination valve, piston, cylinder and annular gap seal, according to claim 8,

comprised of oversized dimensions in relation to the distance between piston and groove base, so that the annular gap seal may be laid in the groove with pre-tension.

11. A combination valve, piston, cylinder and annular gap seal, according to claim 8,

comprised of stabilizing element which may be laid in the

direction of the groove with the sealing rings.

12. A combination valve, piston, cylinder and annular gap seal, according to claim 8,

wherein the stabilizing element is a coiled spring which may be inserted in a torus shape.

13. A combination valve, piston, cylinder and annular gap seal, according to claim 11,

wherein the sealing rings may be pre-tensioned radially in the direction of the piston using the stabilizing element.

APPENDIX B

Appendix B: Evidence Presented

None.

APPENDIX C

Appendix C: Related Appeals and Proceedings

None